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What we claim is:

- 1 1. A management computer connected through a second
- 2 network to data storage apparatuses that are connected to
- 3 computers through a first network, said management computer
- 4 comprising:
- 5 a storage area information collecting module which collects
- 3 respective pieces of storage area information from said data
- 7 storage apparatuses connected through the second network,
- 8 wherein each piece of storage area information relates to storage
- 9 areas provided by a data storage apparatus concerned:
- a hierarchy information collecting module which collects
- 11 respective pieces of hierarchy information from said data storage
- 12 apparatuses connected through said second network, wherein each
- 13 piece of hierarchy information indicates hierarchy among data
- 14 storage apparatuses held by a data storage apparatus concerned;
- 15 and
- a management relation information creation module which
- 17 sets hierarchy among said data storage apparatuses to create
- 18 management relation information, based on said pieces of storage
- 19 area information and said pieces of hierarchy information
- 20 collected in said storage area information collecting module and
- 21 said hierarchy information collecting module.
 - 1 2. A management computer according to Claim 1, wherein:
 - 2 said management computer further comprises:
 - 3 a management information creation module that

- 4 recognizes a number of data storage apparatuses according to a
- 5 number of said pieces of storage area information collected in said
- 6 storage area information collecting module and prepares pieces of
- 7 management information used respectively for managing said
- 8 data storage apparatuses, wherein a number of said pieces is
- 9 equal to a recognized number of data storage apparatuses; and
- said management relation information creation module
- 11 associates each of said data storage apparatuses with a piece of
- 12 management information used for managing the data storage
- 13 apparatus in question, and adds information indicating the
- 14 association to said management relation information.
- 1 8. A management computer according to Claim 1, further
- 2 comprising:
- 3 a screen data creation module which creates hierarchy
- 4 display screen data that is used for displaying said data storage
- 5 apparatuses on a screen according to the hierarchy set in said
- 6 management relation information creation module; and
- 7 a screen data sending module which sends said hierarchy
- 8 display screen data created in said screen data creation module to
- 9 an output device connected to the management computer itself.
- 1 4. A management computer according to Claim 3, wherein:
- said screen data creation module creates pieces of data
- 3 storage apparatus display data for respectively specifying said
- 4 data storage apparatuses in said hierarchy display screen data,
- 5 and adds pieces of information identifying those pieces of data
- 6 storage apparatus display data to said management relation

- 7 information to hold those pieces of information in said
- 8 management relation information.
- 1 5. A management computer according to Claim 4, further
- 2 comprising:

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- a management module choosing module that refers to said
- 4 management relation information to extract a piece of
- 5 management information corresponding to a certain piece of data
 - storage apparatus display data that is chosen when an instruction
- 7 to choice said certain piece of data storage apparatus display data
- 8 is received from said output device, and sends the extracted piece
- 9 of management information to said output device.
- 1 G. A management computer according to Claim 4, further
- 2 comprising:
- 3 a warning message creation module that:
- 4 refers to said management relation information when an
- 5 instruction to choice a certain piece of data storage apparatus
- 6 display data is received from said output device, to extract a data
- 7 storage apparatus held in said management relation information
- 8 being associated with the chosen piece of data storage apparatus
- 9 display data;
- judges whether the extracted data storage apparatus is a
- 11 data storage apparatus (a first type data storage apparatus)
- 12 providing a storage area for storing data used by a computer or a
- 13 data storage apparatus (a second type data storage apparatus)
- 14 providing a storage area for storing data used by a computer
- 15 through said first type data storage apparatus; and

- when the extracted data storage apparatus is judged to be said second type of data storage apparatus, creates a warning message to send the created warning message to said output device.
 - 1 7. A management computer according to Claim 3, further 2 comprising:
 - 8 a notification modification module that:
- refers to said management relation information to judge 5 whether a data storage apparatus as a source of a status change notification is a data storage apparatus (a first type data storage 6 7 apparatus) providing a storage area for storing data used by a 8 computer or a data storage apparatus (a second type data storage 9 apparatus) providing a storage area for storing data used by a computer through said first type data storage apparatus, when 10 11 said status change notification is received from said data storage 12 apparatus connected to said management computer through said 13 second network; and
- when said data storage apparatus is judged to be said second type of data storage apparatus, refers to said management relation information to create a new display message by reflecting the hierarchy acquired from said management relation information onto contents of the received notification.
- 1 8. A management computer connected through a second
- 2 network to data storage apparatuses that are connected to
- 3 computers through a first network, wherein:
- 4 said management computer comprises an arithmetic unit

5 and a memory; and

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6 said arithmetic unit:

collects respective pieces of storage area information from said data storage apparatuses connected through said second network, wherein each piece of storage area information relates to storage areas provided by a data storage apparatus concerned;

collects respective pieces of hierarchy information from said data storage apparatuses connected through said second network, wherein each piece of hierarchy information indicates hierarchy among data storage apparatuses held by a data storage apparatus concerned:

sets hierarchy among said data storage apparatuses to create management relation information, based on said pieces of storage area information and said pieces of hierarchy information, and of storing the created management relation information into said memory; and

outputs said management relation information stored in said memory.

1 9. A management computer according to Claim 8, wherein:

2 said arithmetic unit:

further recognizes a number of data storage apparatuses according to a number of said pieces of the collected storage area information and creates pieces of management information for respectively managing data storage apparatuses, wherein a number of said pieces is equal to a recognized number of data storage apparatuses and storing the created pieces of management information into said memory; and

- associates each of said data storage apparatuses with a piece of management information used for managing the data storage apparatus in question and adds information indicating the association to said management relation information, in said processing of creating said management relation information and storing the created management relation information into said memory.
 - 1 10. A computer program product for a management computer connected through a second network to data storage apparatuses that are connected to computers through a first network, wherein:
 - 4 said computer program product comprises:
 - a code that collects respective pieces of storage area information from said data storage apparatuses connected through said second network, wherein each piece of storage area information relates to storage areas provided by a data storage apparatus concerned;
- a code that collects respective pieces of hierarchy information from said data storage apparatuses connected through said second network, wherein each piece of hierarchy information indicates hierarchy among data storage apparatuses held by a data storage apparatus concerned;
- a code that sets hierarchy among said data storage apparatuses to create management relation information, based on the collected pieces of storage area information and the collected pieces of hierarchy information collected;
- 19 a code that outputs the created management relation20 information; and

- 1 11. A computer program product according to Claim 10,
- 2 further comprising:
- 3 a code that recognizes a number of data storage
- 4 apparatuses according to a number of said pieces of the collected
- 5 storage area information,
- 6 a code that prepares pieces of management information
- 7 used respectively for managing data storage apparatuses, wherein
- 8 a number of said pieces is equals to a recognized number of data
- 9 storage apparatuses; and
- 10 a code that associates each of said data storage
- 11 apparatuses with a piece of management information used for
- 12 managing said data storage apparatus in question, and adds
- 13 information indicating the association to said management
- 14 relation information.
 - 1 12. A computer system comprising:
- 2 a group of data storage apparatuses including at least one
- 3 first type data storage apparatus providing a storage area for
- 4 storing data used by a computer and at least one second type data
- 5 storage apparatus providing a storage area for storing data used
- 6 by said computer through a first type data storage apparatus;
- 7 a management computer that manages said group of data
- 8 storage apparatuses;
- 9 a first network connecting between said computer and said
- 10 group of data storage apparatuses;
- a second network connecting between said group of data

- 12 storage apparatuses and said management computer;
- 13 wherein:
- said management computer comprises:
- a storage area information collecting module which collects
- 16 respective pieces of storage area information from said data
- 17 storage apparatuses connected through said second network,
- 18 wherein each piece of storage area information relates to storage
- 19 areas provided by a data storage apparatus concerned;
- 20 a hierarchy information collecting module which collects
- 21 respective pieces of hierarchy information from said data storage
- 22 apparatuses connected through said second network, wherein each
- 23 piece of hierarchy information indicates hierarchy among data
- 24 storage apparatuses held by a data storage apparatus concerned;
- 25 and
- 26 a management relation information creation module which
- 27 sets hierarchy among said data storage apparatuses to create
- 28 management relation information based on said pieces of storage
- 29 area information and said pieces of hierarchy information
- 30 collected in said storage area information collecting module and
- 31 said hierarchy information collecting module.
 - 1 13. A data storage apparatus management method in a
 - 2 management computer connected through a second network to
 - 3 data storage apparatuses that are connected to computers through
 - 4 a first network, the method comprising steps of:
 - 5 collecting respective pieces of storage area information
 - 6 from said data storage apparatuses connected through said second
 - 7 network, wherein each piece of storage area information relates to

- 8 storage areas provided by a data storage apparatus concerned;
- 9 collecting respective pieces of hierarchy information from
- 10 said data storage apparatuses connected through said second
- 11 network, wherein each piece of hierarchy information indicates
- 12 hierarchy among data storage apparatuses held by a data storage
- 13 apparatus concerned; and
- setting hierarchy among said data storage apparatuses to
- 15 create management relation information, based on said pieces of
- 16 storage area information and said pieces of hierarchy information.
 - 1 14. A data storage apparatus management method according
- 2 to Claim 13, further comprising steps of:
- 3 recognizing a number of data storage apparatuses
- 4 according to a number of said pieces of the collected storage area
- 5 information;
- 6 preparing pieces of management information for
- 7 respectively managing data storage apparatuses, wherein a
- 8 number of said pieces is equal to a recognized number of data
- 9 storage apparatuses; and
- 10 associating each of said data storage apparatuses with a
- 11 piece of management information used for managing the data
- 12 storage apparatus in question and adding information indicating
- 13 the association to said management relation information, in
- 14 creating said management relation information.
- 1 15. A data storage apparatus management method according
- 2 to Claim 13, further comprising steps of:
- 3 creating hierarchy display screen data that is used for

- 4 displaying said data storage apparatuses on a screen according to
- 5 said management relation information; and
- 6 sending said created hierarchy display screen data to an
- 7 output device connected to the management computer itself.
- 1 16. A data storage apparatus management method according
- 2 to Claim 15, further comprising of steps of:
- 3 creating pieces of data storage apparatus display data for
- 4 respectively specifying said data storage apparatuses in said
- 5 hierarchy display screen data, when said hierarchy display screen
- 6 data is created; and
- 7 adding pieces of information identifying those pieces of
- 8 data storage apparatus display data to said management relation
- 9 information, to hold those pieces of information in said
- 10 management relation information.
 - 1 17. A data storage apparatus management method according
- 2 to Claim 16, further comprising a step of:
- 3 referring to said management relation information to
- 4 extract a piece of management information corresponding to a
- 5 certain piece of data storage apparatus display data that is chosen
- 6 when an instruction to choice said certain piece of data storage
- 7 apparatus display data is received from said output device, and
- 8 sending the extracted piece of management information to said
- 9 output device.
- 1 18. A data storage apparatus management method according
- 2 to Claim 17, further comprising steps of:

referring to said management relation information when an instruction to choice a certain piece of data storage apparatus display data is received from said output device, to extract a data storage apparatus held in said management relation information being associated with the chosen piece of data storage apparatus display data;

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judging whether the extracted data storage apparatus is a dala storage apparatus (a first type data storage apparatus) 10 providing a storage area for storing data used by said computer or 11 a data storage apparatus (a second type data storage apparatus) 13 providing a storage area for storing data used by said computer 14 through said first type data storage apparatus; and

15 creating a warning message to send the created warning 16 message to said output device, when the extracted data storage 17 apparatus is judged to be said second type of data storage 18 apparatus.

- A management computer according to Claim 2, wherein: 1 19.
- 2 said management computer further comprises:
- 3 computer identification information management collecting module which collects respective pieces of management 4 computer identification information from said data storage Б apparatuses through said second network, wherein each piecc of 6 management computer identification information indicates whether a data storage apparatus concerned has been already 8 9 connected to said management computer; and
- said management information creation module does not 10 create a piece of management information with respect to a data 11

- 12 storage apparatus from which said management computer
- 13 identification information collecting module has collected a piece
- 14 of management computer identification information indicating
- 15 that said management computer is connected to said data storage
- 16 apparatus.
 - 1 20. A computer system comprising:
- 2 a computer;
- 3 data storage apparatuses;
- 4 a management computer that manages said data storage
- 5 apparatuses;
- 6 a first network connecting between computers and said
- 7 data storage apparatuses;
- 8 a second network connecting between said data storage
- 9 apparatuses and said management computer; and
- 10 a management console connected to said management
- 11 computer; wherein:
- said data storage apparatuses includes:
- 13 one or more first type data storage apparatuses each
- 14 providing storage areas for storing data used by said computers;
- 15 and
- one or more second type data storage apparatuses each
- 17 providing storage areas for storing data used by said computers
- 18 through a storage area of said first type data storage apparatuses;
- 19 said management computer comprises:
- 20 a storage area information collecting module which collects
- 21 respective pieces of storage area information from said data
- 22 storage apparatuses, wherein each piece of storage area

23 information relates to storage areas provided by a data storage 24 apparatus concerned:

a management information creation module that recognizes a number of data storage apparatuses according to a number of said pieces of storage area information collected in said storage area information collecting module and prepares pieces of management information used respectively for managing said data storage apparatuses, wherein a number of said pieces is equal to a recognized number of data storage apparatuses;

a hierarchy information collecting module which collects respective pieces of hierarchy information from said data storage apparatuses, wherein each piece of hierarchy information indicates hierarchy among data storage apparatuses held by a data storage apparatus concerned;

a management relation information creation module which sets hierarchy among said data storage apparatuses to create management relation information, based on said pieces of storage area information, said pieces of management information and said pieces of hierarchy information collected in said storage area information collecting module, said management information creation module and said hierarchy information collecting module;

a screen data creation module that:

creates hierarchy display screen data that is used for displaying said data storage apparatuses according to the hierarchy set in said management relation information creation module and pieces of data storage apparatus display data for respectively specifying said data storage apparatuses in said hierarchy display screen data, and

adds pieces of information identifying those pieces of data storage apparatus display data to said management relation information.

a screen data sending module which sends said hierarchy display screen data created in said screen data creation module and said data storage apparatus display data to said management console;

a warning message creation module that:

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refers to said management relation information when an instruction to choice a certain piece of data storage apparatus display data is received from said management console, to extract a data storage apparatus held in said management relation information being associated with the chosen piece of data storage apparatus display data;

judges whether the extracted data storage apparatus is a first type data storage apparatus or a second type data storage apparatus; and

when the extracted data storage apparatus is judged to be said second type of data storage apparatus, creates a warning message to said management console;

a management module choosing module that refers to said management relation information to extract a piece of management information corresponding to a certain piece of data storage apparatus display data that is chosen when an instruction to choice said certain piece of data storage apparatus display data is received from said management console, and sends the extracted piece of management information to said management 79 console;

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80 a notification modification module that:

refers to said management relation information to judge whether a data storage apparatus as a source of a status change notification is a first type data storage apparatus or a second type data storage apparatus, when said status change notification is received from said data storage apparatus (i.e., said source of the status change notification); and

when said data storage apparatus is judge to be said second type of data storage apparatus, refers to said management relation information to create a new display message by reflecting the hierarchy acquired from said management relation information onto contents of the received notification; and

a modification notification sending module which sends the display message created in said notification modification module to said management console;

said management console comprises:

a display module which displays the display data received from said management computer;

98 an instruction receiving module which receives an 99 instruction from an administrator through said display module. 100 and

an instruction sending module which sends an instruction received from the administrator through said instruction receiving module to said management computer;

said display module comprises a hierarchy display area, a warning message display area and a status change notification information display area;

107	said hierarchy display area displays said hierarchy display
108	screen data and said data storage apparatus display data,
109	said warning message display area displays said warning
110	message; and
111	said status change notification information display area
112	displays the display message received from said modification
113	notification sending module.